

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA15 | Greatworth to Lower Boddington
Operational assessment (SV-004-015)
Sound, noise and vibration

November 2013

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Department
for Transport

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Appendix SV-004-015

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Operation assessment	004
Community forum area:	Greatworth to Lower Boddington	015

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1 Introduction

1.1 Structure of the sound, noise and vibration appendices

- 1.1.1 The sound, noise and vibration appendices comprise four sections. The first of these details the methodology used (Appendix SV-001-000) and relates to the sound, noise and vibration assessment for all community forum areas (CFA).
- 1.1.2 For the Greatworth to Lower Boddington community forum area (CFA15), the other three sections are as follows:
- baseline sound, noise and vibration (Appendix SV-002-015);
 - construction sound, noise and vibration (Appendix SV-003-015); and
 - operational sound, noise and vibration (Appendix SV-004-015) (this appendix).
- 1.1.3 The outcomes of this assessment are summarised in Volume 2: CFA15 Report, Chapter 11 Sound, Noise and Vibration.
- 1.1.4 Maps referred to throughout the sound, noise and vibration appendices are contained in the Volume 5 sound, noise and vibration map book.
- 1.1.5 This appendix presents the likely noise and vibration impacts, effects and significant effects arising from the operation of the Proposed Scheme for the Greatworth to Lower Boddington area on:
- people, primarily where they live ('residential receptors') in terms a) individual dwellings and b) on a wider community basis, including any shared community spaces; and
 - community facilities such as schools, hospitals, places of worship, and also commercial properties such as offices and hotels, collectively described as 'non-residential receptors' and 'quiet areas'.
- 1.1.6 The assessment of likely impacts, effects and significant effects from operational noise and vibration on agricultural, community, ecological or heritage receptors and the assessment of tranquillity are presented in the following documents within Volume 5:
- Agriculture, forestry and soils Appendix AG-001-015
 - Community Appendix CM-001-015
 - Ecology Appendix EC-005-002
 - Heritage Appendix CH-003-015
 - Landscape and Visual Appendix LV-001-015

1.2 Evaluation of impacts and effects

- 1.2.1 This appendix provides a quantitative assessment of operational noise and vibration impacts and effects and a qualitative assessment of likely significant effects, based on the impacts and effects identified and other local context information consistent with the scope and methodology defined for the Proposed Scheme.

- 1.2.2 Indirect effects arising from permanent changes in traffic patterns on the existing road and rail networks as a consequence of the Proposed Scheme are also reported in this appendix, where they would occur within the study area as defined in Volume 5 Appendix SV-001-000.
- 1.2.3 Route-wide impacts, effects and significant effects associated with noise or vibration from the operation of the Proposed Scheme are reported in Volume 3.
- 1.2.4 Off-route effects of noise or vibration arising from the operation of the Proposed Scheme, including those likely to arise from permanent changes in traffic patterns on roads or railways outside of the study area for direct effects are reported in Volume 4.
- 1.2.5 In undertaking the assessment of sound, noise and vibration, consistent with EIA Regulations and emerging National Planning Practice Guidance¹ a differentiation between impacts effects, adverse effects and significant effects is made. Further information is provided in Volume 5: Appendix SV001-000.
- 1.2.6 The assessment of impacts has been undertaken at assessment locations that are representative of a number of dwellings or other sensitive receptors. The Assessment Locations employed in this assessment are presented on map series Sv-02 in the CFA15 Volume 5 sound, noise and vibration map book.

¹ National Planning Practice Guidance – Noise <http://planningguidance.planningportal.gov.uk> ; refer to the table summarising noise exposure hierarchy

2 Scope, assumptions and limitations

2.1 Regional and local policy guidance

2.1.1 The policy framework for sound, noise and vibration is set out in Volume 1 and in Appendix SV-001-000. As part of the engagement with local authorities through the Planning Forum Sub Group (Acoustics), information regarding any specific local planning guidance in respect of noise and vibration has been requested. Whilst no information has been received for this study area via the Planning Forum Sub Group (Acoustics), the following local policy guidance on noise and vibration has been identified:

- South Northamptonshire Local Plan - Saved Policies - September 2007.

2.1.2 This guidance has been considered as part of formulating the detailed application of the impact and significance criteria set out in Volume 5: particularly Appendix SV-001-000.

2.2 Engagement

2.2.1 Details of engagement on a route-wide basis with the local and county authorities' Environmental Health Practitioners via the Planning Forum Sub Group - Acoustics, is set out in Volume 1, Section 8.

2.2.2 Engagement with communities has been via the Community Forums, as set out in Volume 1. In respect of sound, noise and vibration the following discussions have taken place:

- general discussions in respect of local issues, including possible ways to avoid and mitigate the potential impacts of noise or vibration
- September / October 2012; a specific presentation about sound, noise and vibration with discussion afterwards with one of the project team specialists;
- November / December 2012; specific request for the Community Forum to propose baseline sound monitoring locations;
- January / February 2013; feedback to the Community Forum on any proposed baseline monitoring locations; and
- verbal / written response to questions on sound, noise and vibration.

2.3 Methodology

2.3.1 The methodology used for the assessment of airborne sound, ground-borne sound and vibration impacts and the determination of significant effects is defined in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1), is clarified in a number of areas by the SMR addendum (Volume 5: Appendix CT-001-000/2). Further information is contained in Volume 5: Appendix SV-001-000.

2.4 Assumptions

- 2.4.1 Route-wide assumptions are outlined in Volume 1, Section 8, and are further detailed in Volume 5: Appendix SV-001-000. Local assumptions that apply to the assessment of operational sound noise and vibration within this CFA are set out in Volume 2: Report 15 and below.

Maintenance Loops

- 2.4.2 As part of the Proposed Scheme, there will be the provision of two sets of maintenance loops. These will be constructed near Wormleighton. These maintenance loops will consist of an additional section of track each side of the operational railway which will be provided to ensure the operational efficiency of the railway.
- 2.4.3 These maintenance loops are primarily provided for the daytime storage of track machines that cannot return to Calvert IMD for operational reasons, but could also be used for the temporary storage of HS2 trains that are required to be removed from operational service. The maintenance loops are shown on map series SV-02 in the CFA15 Volume 5 sound, noise and vibration map book.
- 2.4.4 The use of these maintenance loops will be infrequent and the activities most likely to be carried out on these loops will be occasional cleaning and preparation of track machines during the day. It is not expected that these maintenance loops will be in regular operational use and the majority of the servicing of track machines will be carried out at Calvert IMD which is located in study area CFA 13, where more appropriate facilities are located. Due to their infrequent use, it is not expected that the maintenance loops will lead to any significant operational noise impacts.

2.5 Local limitations

- 2.5.1 In this area, there are a number of locations where the land or property owners did not permit baseline sound level monitoring to be undertaken at their premises. However, sufficient information has been obtained to undertake the assessment. Further information is provided in Volume 5: Appendix SV-002-015.

3 Environmental baseline

3.1 Existing baseline

- 3.1.1 Baseline sound level data has been collected at locations representative of the airborne sound-sensitive receptors. The existing and future baseline airborne sound levels derived from these measurements are included within Table 3. Details of the baseline data collection and the methodology are given in Volume 5: Appendix SV-001-000 and specifically for this study area in Volume 5: Appendix SV-002-015.
- 3.1.2 The majority of receptors adjacent to the line of the route are not currently subject to appreciable vibration and therefore vibration at all receptors has been assessed using the absolute vibration criteria as described in Volume 5: Appendix SV-001-000.

3.2 Future baseline

- 3.2.1 The assessment is based upon the predicted change in sound levels that result from the Proposed Scheme. The assessment initially considered a worst case (that would overestimate the change in levels) by assuming that sound levels would not change from the existing baseline year of 2012/2013. Where significant effects were identified on this basis, the effects have been assessed using the baseline year of 2026 to coincide with the proposed start of passenger services. The future baseline is for the sound environment that would exist in 2026 without the Proposed Scheme.

4 Effects arising during operation

4.1 Introduction

4.1.1 The assessment is reported first for ground-borne sound and vibration and then for airborne sound. Under each of these headings, the results of the quantitative identification of impacts and effects are presented. This is followed by the identification of significant effects and the evidence used to support these conclusions.

4.1.2 The structure of this assessment report is:

- Avoidance and mitigation measures
- Quantitative identification of impact and effects
 - Ground-borne sound and vibration
 - Residential
 - Non-residential
 - Airborne sound
 - Residential
 - Non-residential
- Assessment of impacts and effects
 - Residential receptors: direct effects – dwellings
 - Residential receptors: direct effects – communities
 - Residential receptors: indirect effects
 - Non-residential receptors: direct effects
 - Non-residential receptors: indirect effects
 - Cumulative effects from the proposed scheme and other committed development.

4.2 Avoidance and mitigation measures

4.2.1 These are set out in Volume 2: Report 15.

4.3 Quantitative identification of impacts and effects

Ground-borne noise and vibration

4.3.1 Assessment locations defined for the quantitative assessment of impacts are shown on map series SV-02 in the CFA15 Volume 5 sound, noise and vibration map book.

4.3.2 For each Assessment Location, the assessment results for residential and non-residential receptors are presented in Table 1. Explanation of the information in Table 1 is provided in Appendix SV-001-000, with the following additional notes.






B	For non-residential receptors further detail about the type of effect is set out in the text of Volume 5: Appendix SV-001-000.
NA	Type of effect - Generally no adverse effect
A	Type of effect - Adverse effect
S	Type of effect - Significant adverse effect
VDV	Vibration Dose Value
~	The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000).
^	The impact methodology has identified a potential significant effect at this receptor which based upon further qualitative information is not considered to be a likely significant effect. Please refer the end of this Appendix for further information.
	Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced residential community area, or individual receptor.
	Yellow denotes a low ground-borne noise impact or a minor ground-borne vibration impact
	Orange denotes a medium ground-borne noise impact or a moderate ground-borne vibration impact
	Red denotes a high ground-borne noise impact or a major ground-borne vibration impact
	Dark red denotes a very high ground-borne noise impact

Table 1: Ground-borne sound and vibration levels, noise and vibration impacts and effects

Assessment location		Impact				Significance criteria								Significant effect
		Ground-borne sound level dB L_{pASmax}	VDV $m/s^{1.75}$ Daytime (07:00 - 23:00)	VDV $m/s^{1.75}$ Night time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
ID	Area represented													
259796	Banbury Lane, Lower Thorpe Mandeville	-	0.00	0.00	-	3	NA	R	T	-	-	-	-	

Impact summary





- 4.3.3 The operational ground-borne noise and vibration impacts identified in Table 1 are summarised in Table 2.

Table 2: Summary of operational ground-borne noise and vibration impacts

	Number of ground-borne noise impacts			
	Low	Medium	High	Very High
Residential properties	0	0	0	0
Non-residential properties	0			0
	Number of ground-borne vibration impacts			
	Minor	Moderate	Major	Risk of building damage
Residential properties	0	0	0	0
Non-residential properties	0			0

Airborne sound: direct impacts and effects

- 4.3.4 The direct effects from the operation of the Proposed Scheme as well as any new, amended or altered roads or railway lines, which are identified as part of the scheme, are presented in Table 3.
- 4.3.5 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 3. The results should be considered in conjunction with the information contained in map series Sv-02 in the CFA15 Volume 5 sound, noise and vibration map book.
- 4.3.6 Explanation of the Table 3 information is provided in Volume 5: Appendix SV001-000, with the following additional notes.

	Where the significant effect column is marked, then a significant effect is identified at the referenced group of dwellings, or individual residential or non-residential receptor.
	Yellow denotes a minor impact at a residential building – a change is of 3-5 dB
	Orange denotes a moderate impact at a residential building – a change is of 5-10 dB
	Red denotes a major impact at a residential building – a change is of >10 dB
*	Day - $L_{pAeq,07:00-23:00}$
**	Night - $L_{pAeq,23:00-07:00}$
***	Max - L_{pAFmax} In the Proposed Scheme only column, two values are presented. The first is the value for the HS2 mitigated train and the second is the value for the TSI compliant train. For further information refer to Volume 5: Appendix SV-001-000.
****	Where the Proposed Scheme modifies an existing source, i.e. road or railway realignments, the <i>Proposed Scheme only</i> level in the table includes the sound from the modified source. In this situation the <i>Do something (Opening year baseline + Year 15 traffic)</i> level has been corrected so as to not double count the sound associated with the road or railway on its new and existing alignment.
A	Adverse effect
B	For non-residential receptors further detail about the type of effect is set out in the text of Appendix SV-001-000.

CD	Committed Development. The value in brackets in the number of impacts represented column is the value with the committed development.
G	(G1)Theatres, large auditoria and concert halls, (G2) Sound recording and broadcast studios, (G3) Places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls, (G4) Schools, colleges, hospitals, hotels and libraries, and (G5) Offices and general commercial premises
H	High existing ambient sound level. Defined as $>65\text{dB}_{\text{Aeq, day}}$ and/or $>55\text{dB}_{\text{Aeq, night}}$
L	Low existing ambient sound level. Defined as $<42\text{dB}_{\text{Aeq, day}}$ and/or $<32\text{dB}_{\text{Aeq, night}}$
LD	Landscape receptor
NA	Generally no adverse effect
NI	The receptor is predicted to qualify for mitigation, which shall be provided to the specification defined in the Noise Insulation (Railways and other Guided Rail Systems) Regulations 1996
R	Residential
RM	Residential mooring
S	Significant adverse effect
U	Unacceptable adverse effect
#	A change of 3dB or greater has been identified however, the assessment methodology only defines an impact where the absolute sound level from the Proposed Scheme is greater or equal to 50 dB $L_{\text{pAeq, 23:00} - 07:00}$ during the daytime or 40 dB $L_{\text{pAeq, 07:00} - 23:00}$ at night. At the receptor denoted the absolute level condition is not met and therefore no impact is identified.
~	The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000)..
\$	A change of 3dB or greater has been identified however, the impact methodology for non-residential receptors includes a screening criteria for G3 building use of 50 dB $L_{\text{pAeq, 07:00} - 23:00}$, for G4 building use 55 dB $L_{\text{pAeq, 07:00} - 23:00}$ and 45 dB $L_{\text{pAeq, 23:00} - 07:00}$, for G5 building use 55 dB $L_{\text{pAeq, 07:00} - 23:00}$. At the receptor denoted the screening criteria is not met and therefore no impact is identified. Further information is provided in Volume 5: Appendix SV-001-000.
^	The impact methodology has either identified an impact at a receptor which based upon further qualitative information does not gives rise to a significant effect. Further information is provided at the end of this Appendix.

Table 3: Operational airborne sound level, noise impacts and effects

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
250347	Appletree, Daventry	45	36	61/64	54	53	47	54	53	1	0	NA	6	R	T	-	-	-	-	
250363	Unnamed Road, Aston Le Walls	46	37	61/64	54	53	47	55	53	1	0	NA	6	R	T	-	-	-	-	
250944	Mill Lane, Chipping Warden	40	31	55/58	50	40	48	50	40	0	1	NA	16	R	T	-	-	-	-	
251074	Hogg End, Chipping Warden	37	27	54/57	50	40	48	50	40	0	0	NA	47	R	T	-	-	-	-	
251187	Mill Lane, Chipping Warden	39	30	55/58	50	40	48	50	40	0	0	NA	10	R	T	-	-	-	-	
251231	Culworth Road, Chipping Warden	41	31	57/60	50	40	48	50	40	1	1	NA	5	R	T	-	-	-	-	
251253	Byfield Road, Chipping Warden	39	30	56/59	50	40	48	50	40	0	0	NA	16	R	T	-	-	-	-	
251398	Byfield Road, Chipping Warden	38	29	56/59	67	62	69	67	62	0	0	NA	17	R	T	H	-	-	-	
251478	Appletree Road, Chipping Warden	37	28	55/58	51	46	52	51	46	0	0	NA	34	R	T	-	-	-	-	
251564	Appletree Road, Chipping Warden	37	28	55/58	51	46	52	51	46	0	0	NA	8	R	T	-	-	-	-	
251660	Byfield Road, Chipping Warden	37	28	56/59	58	53	69	58	53	0	0	NA	8	R	T	-	-	-	-	
252223	Byfield Road, Chipping Warden	45	37	58/61	51	46	52	52	46	1	1	NA	2	R	T	-	-	-	-	
252318	Byfield Road, Chipping Warden	37	27	56/59	67	62	69	67	62	0	0	NA	6	R	T	H	-	-	-	
252931	Banbury Road, Lower Boddington	45	35	58/61	48	41	54	50	42	2	1	NA	1	R	T	-	-	-	-	
253196	Lower Boddington, Daventry	47	38	60/63	48	40	43	51	42	2	2	NA	1	R	T	-	-	-	-	
253215	Lower Boddington, Daventry	61	52	75/78	48	40	43	62	52	13	13	A	1	R	T	-	-	-	-	~

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
253243	Lower Boddington, Daventry	61	51	77/80	48	40	43	61	52	12	12	A	1	R	T	-	-	-	-	~
253407	Lower Boddington, Daventry	44	35	57/60	48	40	43	50	41	1	1	NA	2	R	T	-	-	-	-	
253775	Field's Cottages, Aston Le Walls	50	41	68/71	54	53	47	55	53	2	0	A	0	R	T	-	-	-	-	
253881	Millers Close, Lower Boddington	46	37	59/62	58	51	54	58	52	0	0	NA	17	R	T	-	-	-	-	
253911	Banbury Road, Lower Boddington	51	42	65/68	52	50	59	54	50	3	1	A	1	R	T	-	-	-	-	~
253999	Banbury Road, Lower Boddington	48	39	61/64	48	41	54	51	43	3	2	NA	19	R	T	-	-	-	-	#
254077	The Paddock, Lower Boddington	47	38	60/63	42	35	31	48	40	6	4	NA	8	R	T	L	-	-	-	#
254410	Owl End Way, Lower Boddington	45	36	58/61	42	35	31	47	39	5	3	NA	13	R	T	L	-	-	-	#
254441	Hill Road, Lower Boddington	47	38	60/64	50	40	51	52	42	2	2	NA	9	R	T	-	-	-	-	
254458	Hill Road, Lower Boddington	46	36	59/62	50	40	51	51	42	1	1	NA	9	R	T	-	-	-	-	
254530	Hill Road, Lower Boddington	43	34	57/60	44	35	42	47	38	3	3	NA	3	R	T	-	-	-	-	#
254549	Banbury Road, Lower Boddington	49	40	64/67	58	51	53	58	51	1	0	A	15	R	T	-	-	-	-	
254552	Lower Boddington, Daventry	47	37	60/63	44	35	42	49	39	4	4	NA	2	R	T	-	-	-	-	#
255547	Butlers Close, Aston Le Walls	39	29	56/59	44	40	49	45	40	1	0	NA	34	R	T	-	-	-	-	
255726	Blacksmiths Lane, Aston Le Walls	43	33	59/62	53	52	51	53	52	0	0	NA	1	R	T	-	-	-	-	
255782	Blacksmith's Lane, Aston Le	39	30	55/58	53	52	51	53	52	0	0	NA	7	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
	Walls																			
255852	Main Street, Aston Le Walls	36	28	52/55	44	40	49	45	40	1	0	NA	32	R	T	-	-	-	-	
256033	Blacksmiths Lane, Aston Le Walls	38	30	55/58	53	52	51	53	52	0	0	NA	6	R	T	-	-	-	-	
256202	Blacksmiths Lane, Aston Le Walls	39	30	54/57	44	40	49	46	40	1	0	NA	19	R	T	-	-	-	-	
256231	Main Street, Aston Le Walls	37	28	53/56	53	52	51	53	52	0	0	NA	6	R	T	-	-	-	-	
256498	Welsh Road, Aston Le Walls	45	36	62/65	53	52	51	54	52	1	0	NA	2	R	T	-	-	-	-	
256919	Cedars Farm, Boddington	61	52	70/73	48	40	43	62	52	13	13	A	1	R	T	-	-	-	-	~
256946	The Green, Lower Boddington	51	41	64/67	50	40	53	53	44	3	4	A	4	R	T	-	-	-	-	~
257184	Appletree Lane, Aston Le Walls	39	31	57/60	53	52	51	53	52	0	0	NA	1	R	T	-	-	-	-	
257741	Banbury Lane, Thorpe Mandeville	50	41	63/66	51	41	43	54	44	2	3	A	3	R	T	-	-	-	-	OSV15-Co1
257763	Home Farm, Edgecote	46	36	59/62	46	39	46	49	41	3	2	NA	0	R	T	-	-	-	-	#
257793	Banbury Lane, Thorpe Mandeville	47	37	61/64	46	39	46	49	41	3	2	NA	2	R	T	-	-	-	-	#
257837	Banbury Lane, Thorpe Mandeville	44	35	59/62	46	39	46	48	41	2	1	NA	1	R	T	-	-	-	-	
257909	The Warren, Thorpe Mandeville	41	32	55/58	49	43	55	50	43	1	0	NA	17	R	T	-	-	-	-	
257958	Townsend Lane, Thorpe Mandeville	40	30	52/55	46	39	46	47	40	1	1	NA	5	R	T	-	-	-	-	
257990	Banbury Lane, Thorpe Mandeville	42	33	55/58	46	39	46	47	40	1	1	NA	12	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
258009	Banbury Lane, Thorpe Mandeville	45	36	59/63	46	39	46	48	41	2	2	NA	0	R	T	-	-	-	-	
258470	Culworth Road, Chipping Warden	64	55	77/80	47	44	46	64	55	17	11	S	4	R	T	-	-	-	NI	OSV15-Do2
258653	Edgcote, Banbury	50	40	64/67	52	48	57	54	49	2	1	A	2	R	T	-	-	-	-	
258741	Edgcote, Banbury	46	37	62/65	41	33	45	48	38	6	6	NA	1	R	T	L	-	-	-	#
258773	Edgcote, Banbury	47	38	63/66	41	33	45	48	39	7	6	NA	7	R	T	L	-	-	-	#
258938	Home Farm, Edgcote	47	38	58/61	41	33	45	48	39	7	6	NA	1	R	T	L	-	-	-	#
259052	Byfield Road, Chipping Warden	41	33	59/62	51	46	52	51	46	0	0	NA	8	R	T	-	-	-	-	
259138	Edgcote, Banbury	43	34	60/63	45	36	44	47	38	2	2	NA	1	R	T	-	-	-	-	
259161	Edgcote, Banbury	51	42	61/64	52	48	57	54	49	3	1	A	1	R	T	-	-	-	-	~
259421	Thorpe Mandeville, Banbury	45	36	60/63	46	39	46	48	41	3	2	NA	1	R	T	-	-	-	-	#
259611	Chipping Warden, Banbury	49	40	63/66	46	43	46	51	44	5	2	A	1	R	T	-	-	-	-	#
259666	Thorpe Mandeville, Banbury	63	53	75/78	44	34	42	63	53	18	19	A	1	R	T	-	-	-	-	~
259722	Thorpe Mandeville, Banbury	56	47	69/72	46	44	48	56	49	10	4	A	1	R	T	-	-	-	-	~
259796	Lower Thorpe Mandeville, Banbury	62	53	76/80	45	41	45	62	53	17	12	A	3	R	T	-	-	-	-	OSV15-Co1
259849	Banbury Lane, Thorpe Mandeville	48	39	62/66	45	41	45	50	43	5	2	NA	3	R	T	-	-	-	-	#
259855	Banbury Lane, Thorpe Mandeville	52	43	67/70	47	41	49	53	45	7	4	A	4	R	T	-	-	-	-	OSV15-Co1
260205	Culworth, Banbury	43	35	57/60	46	39	46	47	40	2	1	NA	2	R	T	-	-	-	-	
260795	Culworth Road, Chippingen	44	36	61/64	50	40	48	51	41	1	1	NA	0	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
260837	Trafford Bridge, Culworth	60	51	76/79	46	43	46	60	51	14	9	A	1	R	T	-	-	-	-	-
270850	Brackley Road, Greatworth	41	31	62/65	46	42	49	47	42	1	0	NA	14	R	T	-	-	-	-	
271017	Helmdon Road, Greatworth	41	31	59/62	47	37	43	48	38	1	1	NA	17	R	T	-	-	-	-	
271112	Helmdon Road, Greatworth	41	32	59/62	47	37	43	48	38	1	1	NA	1	R	T	-	-	-	-	
271147	Chapel Road, Greatworth	37	28	53/56	47	37	43	47	38	0	0	NA	2	R	T	-	-	-	-	
271324	Pargeter Close, Greatworth	37	28	54/57	46	42	49	47	42	0	0	NA	13	R	T	-	-	-	-	
271435	Greatworth, Banbury	37	28	56/59	47	37	43	47	38	0	0	NA	50	R	T	-	-	-	-	
271468	Helmdon Road, Greatworth	45	36	63/66	47	39	44	49	41	2	2	NA	4	R	T	-	-	-	-	
271489	Helmdon Road, Greatworth	45	36	62/65	46	41	50	49	42	3	1	NA	8	R	T	-	-	-	-	#
271527	Helmdon Road, Greatworth	45	35	61/64	47	37	43	49	39	2	2	NA	10	R	T	-	-	-	-	
271605	Whitton Close, Greatworth	41	32	61/64	46	42	49	47	42	1	0	NA	7	R	T	-	-	-	-	
271635	Whitton Close, Greatworth	42	34	60/63	46	42	49	48	42	1	1	NA	5	R	T	-	-	-	-	
271662	Whitton Close, Greatworth	37	29	53/56	46	42	49	47	42	0	0	NA	8	R	T	-	-	-	-	
271759	Peveril Road, Greatworth	41	31	57/60	46	42	49	47	42	1	0	NA	46	R	T	-	-	-	-	
271846	Peveril Road, Greatworth	39	30	56/59	46	42	49	47	42	1	0	NA	15	R	T	-	-	-	-	
271997	Helmdon Road, Greatworth	42	33	61/64	47	37	43	48	39	1	1	NA	8	R	T	-	-	-	-	
272012	Helmdon Road, Greatworth	41	32	59/62	47	37	43	48	38	1	1	NA	16	R	T	-	-	-	-	
272057	Westthorp, Greatworth	39	30	55/58	46	42	49	47	42	1	0	NA	38	R	T	-	-	-	-	
272291	Greatworth, Banbury	41	33	54/57	68	58	68	68	58	0	0	NA	2	R	T	H	-	-	-	
272333	Helmdon Road, Greatworth	46	37	65/68	47	39	44	50	41	2	2	NA	1	R	T	-	-	-	-	
272985	Halse, Brackley	41	32	53/56	48	35	43	49	37	1	2	NA	6	R	T	-	-	-	-	

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		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
273039	Greatworth, Banbury	62	53	79/82	43	36	44	62	53	20	17	S	2	R	T	-	-	-	NI	OSV15-Do1
273073	Greatworth, Banbury	56	47	68/71	48	35	43	57	47	8	12	A	1	R	T	-	-	-	-	~
273083	Greatworth, Banbury	48	39	60/64	48	35	43	51	41	3	5	NA	1	R	T	-	-	-	-	#
273323	Greatworth, Banbury	43	34	55/58	48	35	43	50	38	1	2	NA	1	R	T	-	-	-	-	
700438	Claydon, Banbury	47	37	62/65	54	53	47	55	53	1	0	NA	4	R	T	-	-	-	-	
700468	Main Street, Aston Le Walls	36	27	52/55	44	39	49	45	39	1	0	NA	2	R	T	-	-	-	-	
700469	Banbury Lane, Thorpe Mandeville	50	41	62/65	46	39	46	51	43	5	4	A	1	R	T	-	-	-	-	OSV15-Co1
700491	Banbury Road, Lower Boddington	51	42	64/67	52	50	59	54	50	3	1	A	1	R	T	-	-	-	-	~
250944	St. Peter And St. Paul's Church, Hogg End (Church)	40	31	55/58	50	40	48	50	40	0	1	B	1	G3	T	-	-	-	-	
251253	Wesleyan Chapel, Byfield Road (Chapel)	39	30	56/59	50	40	48	50	40	0	0	B	1	G3	T	-	-	-	-	
252223	Chipping Warden Primary School (Primary School)	45	37	58/61	51	46	52	52	46	1	1	B	1	G4	T	-	-	-	-	
253243	Spella Barn, Lower Boddington (General Commercial)	61	51	77/80	48	40	43	61	52	12	12	B	2	G5	T	-	-	-	-	OSV15-No2
255782	Village Hall, Main Street, Aston Le Walls, (Hall)	39	30	55/58	53	52	51	53	52	0	0	B	1	G3	T	-	-	-	-	
255782	St. Leonard's Church, Main Street (Church)	39	30	55/58	53	52	51	53	52	0	0	B	1	G3	T	-	-	-	-	
255852	The Sacred Heart & Our Lady Church (Church)	36	28	52/55	44	40	49	45	40	1	0	B	1	G3	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								Significant effect
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		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
256498	Washbrook Farm (Equestrian)	45	36	62/65	53	52	51	54	52	1	0	A	2	G5	T	-	-	-	-	
257763	St. John The Baptist Church, Thorpe Mandeville, (Church)	46	36	59/62	46	39	46	49	41	3	2	B	1	G3	T	-	-	-	-	\$
257909	Village Hall, Banbury Lane, Thorpe Mandeville, (Hall)	41	32	55/58	49	43	55	50	43	1	0	B	1	G3	T	-	-	-	-	
257990	Three Conies Inn, Banbury Lane, Thorpe Mandeville, (Inn)	42	33	55/58	46	39	46	47	40	1	1	B	1	G5	T	-	-	-	-	
258741	St. James Church, Edgcote, (Church)	46	37	62/65	41	33	45	48	38	6	6	B	1	G3	T	-	-	-	-	\$
258773	Edgcote House Stables, Edgcote (Stables)	47	38	63/66	41	33	45	48	39	7	6	B	1	G5	T	-	-	-	-	\$
270850	St. Peters Church, Church Road, Greatworth (Church)	41	31	62/65	46	42	49	47	42	1	0	B	1	G3	T	-	-	-	-	
271017	Post Office, Marston Road, Greatworth (Post Office)	41	31	59/62	47	37	43	48	38	1	1	B	1	G5	T	-	-	-	-	
271112	Greatworth County Primary School (School)	41	32	59/62	47	37	43	48	38	1	1	B	1	G4	T	-	-	-	-	
271112	Greatworth Sports & Social Club (British Legion Club)	41	32	59/62	47	37	43	48	38	1	1	B	1	G5	T	-	-	-	-	
271147	The Inn, Chapel Road, Greatworth (Inn)	37	28	53/56	47	37	43	47	38	0	0	B	1	G5	T	-	-	-	-	
271147	Greatworth Methodist Church, Chapel Road (Church)	37	28	53/56	47	37	43	47	38	0	0	B	1	G3	T	-	-	-	-	
273039	Greatworth Hall, Greatworth (Office)	62	53	79/82	43	36	44	62	53	20	17	B	4	G5	T	-	-	-	-	OSV15-No1

Assessment Location		Impact criteria										Significance criteria								Significant effect
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		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
700438	Lawnhill Barn, Claydon (General Commercial)	47	37	62/65	54	53	47	55	53	1	0	B	1	G5	T	-	-	-	-	
700468	St. Mary's RC Primary School, Main Street (Primary School)	36	27	52/55	44	39	49	45	39	1	0	B	1	G4	T	-	-	-	-	

Direct impact - Summary

4.3.7 The operational airborne noise impacts identified in Table 3 are summarised in Table 4.

Table 4: Summary of operational airborne sound impacts

Receptor	Number of impacts		
	Minor	Moderate	Major
Residential properties	10	5	16
Non-residential properties	0	0	6
Quiet areas	None	None	None

4.4 Assessment of impacts and effects

Residential receptors: direct effects - individual buildings

4.4.2 Taking account of the avoidance and mitigation measures incorporated into the Proposed Scheme, the assessment has identified a number of residential buildings close to the Proposed Scheme where the daytime forecast noise level does not exceed the threshold set in the Regulations but the forecast night-time noise level would exceed the World Health Organization's Interim Target of 55dB² or the maximum noise level (dependent on the number of train passes) as a train passes exceeds the criterion³. It is therefore estimated that these buildings will be offered noise insulation as described previously in the Avoidance and mitigation measures section, of Volume 2: Report 15. These buildings are indicated on Volume 5: Map Book - Sound, noise and vibration, Map series SV-02:

- The Dairy, Granary Barn, The Threshing Barn and The Forge on Culworth Road near Chipping Warden, represented by receptor reference 258470 (marked as OSV15-Do2 in Table 3); and
- The Old Dairy and the dwelling at Greatworth Hall, Greatworth, represented by receptor reference 273039 (marked as OSV15-Do1 in Table 3). These dwellings are also identified as being likely to qualify for noise insulation as a consequence of construction noise as described earlier in this section.

4.4.3 The mitigation measures including noise insulation will reduce noise inside all dwellings such that it will not reach a level where it would significantly affect residents.

Residential receptors: direct effects –communities

4.4.4 The mitigation measures in this area will avoid airborne noise adverse effects on the majority of receptors, and at the following communities:

² World Health Organization, Night-time Noise Guidelines for Europe, 2010

³ During the night (2300-0700) a significant effect is also identified where the Proposed Scheme results in a maximum sound level at the façade of a building at or above: 85 dB L_{pAFmax} (where the number of train pass-bys exceeding this value is less than or equal to 20); or 80 dB L_{pAFmax} (where the number of train pass-bys exceeding this value is greater than 20).

- Greatworth;
- Chipping Warden;
- Aston le Walls; and
- Lower Boddington.

- 4.4.5 Taking account of the envisaged mitigation, Map Series SV-02 (Volume 5 Map book) shows the long term 40dB⁴ night-time sound level contour from the operation of trains on the Proposed Scheme. The extent of the 40dB night-time sound level contour is equivalent to, or slightly larger than, the 50dB daytime contour⁵. In general, below these levels adverse effects are not expected.
- 4.4.6 Above 40dB during the night and 50dB during the day the effect of noise is dependent on the baseline sound levels in that area and the change in sound level (magnitude of effect) brought about by the Proposed Scheme. The airborne noise impacts and effects forecast for the operation of the scheme are presented on Map Series SV-02 (Volume 5 Map Book).
- 4.4.7 Approximately 15 isolated properties within the area have been identified as being subject to an observed adverse noise effect; these effects are likely to be considered as an effect on the acoustic character of the area such that there is a perceived change in the quality of life. However, as the affected properties are spatially remote from larger defined residential areas, are subject to smaller magnitudes of noise effect, or are small in number, the effects are not considered to be significant.
- 4.4.8 The changes in noise levels are likely to affect the acoustic character of the area such that there is a perceived change in the quality of life and are considered to be significant when assessed on a community basis taking account of the local context, as identified in Table 5.

Table 5: Direct adverse effects on residential communities and shared open areas that are considered significant on a community basis

Significant effect number (see Map series SV-02, Table 1 and 3)	Source of significant effect	Time of day	Location and details
OSV15-C01	Airborne noise increase from new train services	Daytime and night-time	Thorpe Mandeville. Approximately 10 dwellings in the vicinity of Banbury Lane. Forecast increases in sound from the railway are likely to cause a major adverse effect on the acoustic character of the area around the closest properties. The effect on the acoustic character of residential areas that are located further from the railway would be either moderate or minor. There are no shared open spaces identified as being affected in this community area.

⁴ Defined as the equivalent continuous sound level from 23:00 to 07:00 or $L_{pAeq,night}$

⁵ With the train flows described in the assumptions section of this CFA Report, the daytime sound level (defined as the equivalent continuous sound level from 07:00 to 23:00 or $L_{pAeq,day}$) from the Proposed Scheme would be approximately 10dB higher than the night-time sound level. The 40dB contour therefore indicates the distance from the Proposed Scheme at which the daytime sound level would be 50dB.

Residential receptors: indirect effects

- 4.4.9 Changes in road traffic due to the Proposed Scheme is likely to result in an increase in road traffic noise levels of approximately 3dB, on Welsh Road between Culworth Road and A361 near Chipping Warden (further information on traffic flows is provided in Section 12: Traffic and Transport). This section of Welsh Road is not populated.
- 4.4.10 The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

Non-residential receptors: direct effects

- 4.4.11 The assessment has identified airborne noise impacts at offices at Greatworth Hall and Spella Barn, represented by receptor references 273039 and 253243.

Greatworth Hall

- 4.4.12 A major operational noise impact has been identified based upon the change in the airborne noise level incident at this receptor, reference 273039. An assessment has been undertaken to determine if this impact would result in a likely significant effect at this non-residential receptor, using the significance criteria detailed in Volume 5: Appendix 001-000.
- 4.4.13 Greatworth Hall includes four office buildings; The Granary, Old Diary A, The Stables and The Garner. This receptor is located approximately 100m from the Proposed Scheme alignment, the building is a converted agricultural structure, ventilation is assumed to be provided by opening windows.
- 4.4.14 Greatworth Hall offices are identified, on a precautionary basis, as being subject to a significant adverse effect denoted by OSV15-No1 in Table 3 and drawing SV-02 (see CFA15 Volume 5 sound, noise and vibration map book). This may take the form of the activity disturbance to the people using the offices.

Spella Barn

- 4.4.15 A major operational noise impact has been identified based upon the change in the airborne noise level incident at this receptor, reference 253243. An assessment has been undertaken to determine if this impact would result in a likely significant effect at this non-residential receptor, using the significance criteria detailed in Volume 5: Appendix 001-000.

- 4.4.16 Spella Barn is a one / two storey brick building, with a tiled roof and it is assumed to be fitted with single glazed windows which are opened to provide ventilation. The building is single aspect with no windows on the façade adjacent to the road. This receptor also includes another non-residential building located to the rear of Spella House, which is a two storey building assumed to be fitted with double glazed windows which are opened to provide ventilation.
- 4.4.17 These offices are identified, on a precautionary basis, as being subject to a significant adverse effect denoted by OSV24-No1 in Table 3 and drawing SV-02 (see CFA15 Volume 5 sound, noise and vibration map book). This may take the form of the activity disturbance to the people using the offices.

Summary

- 4.4.18 The assessment of operational noise and vibration indicates that significant effects are likely on the non-residential receptors identified in Table 6.
- 4.4.19 The assessment of effects on non-residential receptors has been undertaken on a reasonable worst case basis taking account of public available information about each receptor. Further information can be found in Volume 5: Appendix SV-004-015.

Table 6: Likely significant noise or vibration effects on non-residential receptors arising from operation of the Proposed Scheme

Significant effect number (see Map series SV-02, Table 1 and 3)	Type of significant effect and source	Time of day	Location and details
OSV15-No1	Major airborne noise effect on the acoustic character around the church and a risk of disturbing activities inside the offices buildings due to the operation of train services..	Daytime	Offices at Greatworth Hall located closest to the route (may include conference facilities)
OSV15-No2	Major airborne noise effect on the acoustic character around the church and a risk of disturbing activities inside the offices buildings due to the operation of train services.	Daytime	General commercial property at Spella Barn, Lower Boddington.

Non-residential receptors: indirect effects

- 4.4.20 Changes in road traffic due to the Proposed Scheme is likely to result in an increase in road traffic noise levels of approximately 3dB, on Welsh Road between Culworth Road and A361 near Chipping Warden (further information on traffic flows is provided in Section 12: Traffic and Transport). This section of Welsh Road does not have any non-residential buildings adjacent to it.
- 4.4.21 The assessment of operational noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in this area.

Cumulative effects

- 4.4.22 Details of properties being currently developed which were afforded planning approval before the safeguarding date are presented in Volume 5: Appendix CToo4-000. Within this area, the operational sound, noise or vibration associated with these developments in conjunction with the operation of the Proposed Scheme do not result in any significant cumulative effects.